REMARKS

Claims 1-12 are pending in the Application. Claim 1 is independent. The specification has been amended solely to reflect the current status of the parent application cited therein; accordingly, no new matter is added by this amendment.

Rejection Under 35 USC § 112, first paragraph

Claims 1-12 were rejected as allegedly failing to comply with the written description requirement. Applicant respectfully traverses the rejection. The instantly claimed invention is directed to a method for forming multiple identity substrate material. For example, as described at page 37 of the specification, said multiple identity substrate material is useful for optical storage and optical writing. More specifically, DNA polymers attached to solid supports are capable of exhibiting multiple chromophoric responses, photonic energy transfer and quenching as demonstrated in Figures 6, 7 and 8.

Importantly, in contrast to the Examiner's contention, the invention is not limited to specific DNA sequences. To the contrary, any sequence may be used so long as said selected sequences are capable of hybridizing to other sequences. Designing appropriate sequences for use in the presently claimed invention is well within the knowledge of one of ordinary skill in the art. Indeed, it is not the sequences *per se* that are important to the instantly claimed invention, but rather the resulting substrates having multiple identities, as exemplified by multi-colored areas of said substrate.

The specification describes four separate mechanisms by which information can be written into DNA substrate materials: (i) spatial UV inactivation of thymidines within DNA sequences; (ii) spatial UV inactivation of fluorophores and chromophores; (iii) spatial UV

inactivation or activation of quencher chromophores; and (iv) spatial UV inactivation or activation of subsequent hybridization by crosslinking, particularly through the use of psoralens. (*See, e.g.*, page 37.)

As described beginning at page 38, and shown schematically in Figures 9-19, the method for forming multiple identity substrate material involves several steps. When DNA containing psoralen compounds intercalated therein are capable of being crosslinked upon exposure to UV light. Figure 9 shows DNA sequences having a particular identity (A) covalently attached to a substrate that had been previously treated with APS to facilitate said covalent attachment. In Figure 10, a psoralen-modified sequence (B), which is complementary to sequence (A), is hybridized to all four quadrants of the substrate. A UV mask is then used to block quadrant 1, in Figure 11, while the other quadrants are exposed to UV radiation at 365nm, which causes the psoralen molecules to crosslink the (A) and (B) sequences.

In Figure 12, the entire surface is subjected to a dehybridization process, which allows the non-crosslinked (B) sequence to be removed from the (A) sequences in quadrant 1. As shown in Figure 13, the entire process is repeated with a sequence having identity (C), a portion of which is complementary to at least a portion of the (B) sequence. Figures 14-18 schematically demonstrate repetition of the process for quadrants 2, 3, and 4. Figure 19 shows that at this point in the process, the specificity of four sequences (A),(B),(C), and (D) can be verified by exposing the substrate to fluorescently labeled, complementary DNA sequences such that each quadrant fluoresces with its particular color if the process has been carried out properly.

In the second step of write process, as shown schematically in Figures 20, 21 and 22, an additional masking and UV irradiation exposure (at lower wavelength) can render the DNA in the UV-exposed areas incapable of additional hybridization. For example, exposure to higher energy UV radiation can cause thymidine residues within the DNA sequences to dimerize, which has the ultimate effect of "turning off" those sequences. Thus, it is possible to selectively activate various portions of the substrate such that they are capable of fluorescing with different colors.

The multiple identity substrates resulting from the claimed method can subsequently be used for optical data storage and devices, which are useful in authentication, anti-counterfeiting and encryption applications.

Rejection Under 35 USC § 112, second paragraph

Claims 1-12 were rejected as allegedly failing to comply with the enablement requirement. Applicant respectfully traverses this rejection. Figures 7 and 8 provide views of the multiple identity substrates formed according to the instantly claimed method, which was described in the preceding section of this paper. Additionally, as explained at page 41 of the specification and shown in Figure 45, the substrates prepared as a result of practicing the claimed method can be "read," for example, by a laser, which will cause the fluorescently-labeled sections of the substrate to emit photons at pre-determined and multiple wavelengths.

Moreover, the specification discloses that multiple identify substrates fabricated according to the claimed method can be incorporated into, for example, documents, currency and labels much in the same way barcodes are incorporated into a variety of well-

known goods.

Rejection Under 35 USC § 101

Claims 1-12 were rejected as allegedly lacking either a credible and substantial or well-established utility. Applicant respectfully traverse this rejection. First, Figure 8 in the specification unequivocally demonstrates the operability of the claimed method to produce multiple identity substrates. In addition, the specification sets forth several examples explaining how the multiple identity substrates that are formed as a result of the claimed invention can be used in high density and low density optical storage, including, for example, incorporation into documents, currency, labels and as replacements for bar codes that may be "read" according to standard laser techniques that are well known to those of skill in the art.

Second, the Examiner's rejection does not comply with the statutory requirements for a rejection under 35 USC § 101. A proper rejection under 35 USC § 101 requires the Examiner must (a) make a prima facie showing that the claimed invention lacks utility, and (b) provide a sufficient evidentiary basis for the factual assumptions relied upon in establishing said prima facie showing. (*See, In re Folkers*, 344 F.2d 970 (CCPA 1965).) If the Examiner fails to develop a prima facie case and provide *evidentiary support* for the rejection, the rejection must be withdrawn. (*See, In re Gaubert*, 524 F.2d 1222, 1224 (CCPA 1975)("Accordingly, the PTO must do more than merely question operability -- it must set forth factual reasons which would lead one skilled in the art to question the objective truth of the statement of operability.").) In the instant rejection, the Examiner has not provided any evidentiary support that one of skill in the art would conclude that it is

more likely than not that said asserted utilities are not credible. To the contrary, the Examiner's rejection is improperly based on speculation. Accordingly, Applicant respectfully requests that this rejection be re-considered and withdrawn.

Double Patenting Rejections

Claims 1-12 were rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 1-126 of US Pat. No. 6,652,808. While not agreeing with the propriety of the rejection, Applicant has submitted herewith a terminal disclaimer for the 6,652,808 patent.

Applicant respectfully requests that the Examiner reconsider the claim rejections based on the foregoing discussion. Applicant believes the pending claims are allowable and respectfully requests a notice of allowability.

Respectfully submitted,

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